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First Record of *Brundiniella* (Insecta: Diptera: Chironomidae) from the Palaearctic Region, with the Description of a New Species

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Brundiniella yagukiensis sp. nov. is described on the basis of the male and female adults, pupa, and larva. This is the first report of the genus *Brundiniella* from the Palaearctic Region.

Key Words: Chironomidae, Tanypodinae, *Brundiniella*, taxonomy, Japan.

Introduction

The genus *Brundiniella* belongs to the subfamily Tanypodinae and is hitherto known only by the type species, *B. eumorpha* (Sublette, 1964), which is distributed in the Nearctic Region (see Sublette 1964; Roback 1971, 1978a).

Recently I collected very characteristic tanypodine larvae from a small stream in a forest in Iwaki City, Fukushima Prefecture, Japan. These larvae were identified as a species of *Brundiniella* because the antenna has a long style and a long intersegment II/III, the dorsomentum has five teeth and one pointed inner lobe on each side, and the posterior parapod has basally broadened claws. The adults that emerged from them were examined and found to represent a new species, which differs from the closely related species, *B. eumorpha*, in having a vestigial scutal tubercle and setiferous preepisterna.

I give herein descriptions of the male and female adults and the immature forms, pupa and larva, of this new species. This is the first report of *Brundiniella* from the Palaearctic Region.

The holotype and paratypes of the new species are deposited in the Department of Biology, Faculty of Education, Shizuoka University, Japan.

The terminology and abbreviations for general morphology used in this paper follow Saether (1980).

Genus *Brundiniella* Roback, 1978
[Japanese name: Kitamon-yusurika zoku]

Brundinia Roback, 1978a: 168 (preoccupied by Tottenham, 1949: 78).
Brundiniella Roback, 1978b: 141 (new name for *Brundinia* Roback).
Type species: *Anatopynia eumorpha* Sublette, 1964, by original designation.

Emended diagnosis. The generic diagnoses in Roback (1978a), Fittkau and Roback (1983), Kowalyk (1985), Fittkau and Murray (1986), Murray and Fittkau (1989), and Epler (2001) should be emended as follows:

Adult. Scutum with or without vestigial tubercle; preepisternals present or absent. Female genitalia with triangular gonapophysis VIII. Gonotergite IX without setae. Abdominal segment X with a few setae on each side. Postgenital plate triangular.

Pupa. Abdominal shagreen spinules arranged serially in groups of 2–3 or 4–5. D₁-setae progressively moving anteriorly on abdominal tergites V–VII. Abdominal segment VI with 1 taeniate L-seta, VII with 7–10 taeniate L-setae, and VIII with 5 taeniate L-setae; taeniate L-setae rather short on segment VII.

Larva. Cephalic index 0.77–0.95. Antennal segment I 4.5–6.0 times as long as basal width; segment II 2.5–3.0 times as long as wide; style conspicuously to moderately long, at least half as long as segment II.

Remarks. Iridescent eyes occur in adults of *Apsectrotanypus*, *Psectrotanypus*, *Brundiniella*, and *Radotanypus* of the tribe Macropelopiini. Among these genera, *Psectrotanypus* and *Brundiniella* have no setae on the male tergite IX. The adults of these two genera are very similar to each other, but may be separable by the size of the pulvilli on the legs. At least the Holarctic species *Psectrotanypus varius* (Fabricius, 1787), *P. pictipennis* (Zetterstedt, 1838), and *P. dyari* (Coquillett, 1902) have well-developed and large rather than small pulvilli (Tokunaga 1937; Roback 1966, 1971).

The pupa of *Brundiniella* resembles those of *Derotanypus* and *Radotanypus* in having very short taeniate L-setae on abdominal segment VII, but is distinct in the presence of a taeniate L-seta on each side of abdominal segment VI. The latter is a unique feature among macropelopiine pupae.

Further, the larva of *Brundiniella* shares several characters with those of *Macropelopia* and *Bethbilbeckia*: antennal intersegment II/III about as long as the Lauterborn organ, antennal segment III shorter than segment IV, mandible with an appressed basal tooth, two dorsomental plates distinctly separated from one another, ventromentum without a chitinized region connecting the two dorsomental plates, ligula with five teeth, and pecten hypharyngis with a large mesal tooth. But the larva of *Brundiniella* is distinct in having smaller, basally broadened claws on the posterior parapod.

The adults of the species described below partly disagree with the generic diagnosis of Murray and Fittkau (1989) because of the presence of a vestigial scutal tubercle and setiferous preepisterna in the thorax, although the immature forms nearly agree with the diagnoses of Roback (1978a), Fittkau and Roback (1983), Kowalyk (1985), Fittkau and Murray (1986), and Epler (2001). These characters of the adult thorax, found in many genera within the subfamily Tanypodinae, appear to be insignificant for the definition of the genus *Brundiniella*.

***Brundiniella yagukiensis* sp. nov.**
 [Japanese name: Yaguki-kitamon-yusurika]
 (Tables 1–3 and Figs 1–17)

Type material. Holotype: ♂, emerged in laboratory on 18.IV.2002 from sample

of bottom sediment collected from fontal stream in Yaguki, Iwaki City, Fukushima Prefecture (type locality), Japan, 30.III.2002, and mounted on glass slide in Canada Balsam with the associated larval and pupal exuviae. Paratypes: 1♂, 2♀♀, with 3 pupal and 2 larval exuviae, 6 larvae, same data as for holotype (adults emerged on 15–25.IV.2002); 1 larva, same locality as holotype, 15.VIII.2002.

Description. *Male* (h =measurement or count from holotype). Body length 3.2(h)–3.3 mm. Wing length 2.1(h)–2.4 mm.

Coloration: Body predominantly pale yellow; thorax slightly darkened on scutal vittae, anepisternum II, and preepisternum; abdominal tergites IV–VII each with posterior dark band. Wing with 2 transverse dark bands; veins R_2 , RM, MCu, and FCu, and marginal areas of these veins black or dark brown. All legs pale yellow except for dark subapical parts of femora and subbasal parts of tibiae.

Head: Temporals 27(h)–28, multiserial. Antenna with 60(h)–65 μm long apical seta; antennal ratio 1.55(h)–1.75. Clypeus rounded, with 27–31(h) setae. Lengths of palpal segments in Table 1.

Thorax (Fig. 1): Antepronotum with 9(h)–13 setae on each side. Scutum with minute, 2–3(h) μm high tubercle. Acrostichals about 100, multiserial; dorsocentrals 40–48(h), multiserial; humerals 15(h)–17; prealars 25(h)–28, multiserial; supraalars 2; anepisternals 2–3(h); preepisternals 2(h)–3. Scutellum with transverse row of 19(h)–20 long, posterior setae and group of 15–20(h) short, anterior setae. Postnotum with 5–6(h) dorsal setae. Wing (Fig. 2) with dense setae on membrane. Vein C produced beyond R_{4+5} ; RM distinctly beyond MCu; length of Cu/length of M 0.93(h)–0.96. Squama fringed with 26(h)–37 setae. All legs with thorn-like tibial spurs; spur bearing 10–13 side teeth; hind leg with tibial comb of 9 spines. Tarsal beard moderately long; bristle ratio 5.64–6.00(h) in fore leg, 5.00–6.18(h) in middle leg, 5.83(h)–6.00 in hind leg. All claws pointed apically, and each with strong basoventral spines (Fig. 3); pulvilli small. Lengths and ratios of leg segments in Table 2.

Hypopygium (Fig. 4): Tergite IX well developed. Gonocoxite more or less cylindrical, 175(h)–180 μm long, about 2.5 times as long as broad, and with many basal setae on inner surface. Gonostylus parallel-sided or somewhat constricted near base in dorsal view, 115(h)–125 μm long.

Female. Body length 2.5–2.8 mm. Wing length 2.1–2.3 mm.

Coloration: Similar to that of male.

Head: Temporals 33–35 in number. Antenna with 65–80 μm long apical seta; terminal flagellomere slightly longer than preceding 2 flagellomeres together; antennal ratio 0.19–0.20. Clypeus with 34–36 setae. Lengths of palpal segments in Table 1.

Thorax: Antepronotum with 10–14 lateral setae on each side. Scutal tubercle

Table 1. Lengths (μm) of palpal segments in *Brundiniella yagukiensis* sp. nov.

n	Segment					
	I	II	III	IV	V	
Male	2	50(h), 58	45	110(h), 115	200(h), 225	240(h), 250
Female	2	50, 55	40, 43	115, 130	230	303, 298

Note: (h), measurement from holotype.

Table 2. Lengths (μm) and ratios of leg segments in two males of *Brundiniella yagukiensis* sp. nov.

	Coxa	Trochanter	Femur	Tibia	Tarsomere 1
Fore leg	240 (h), 250	190 (h), 150	990 (h), 1050	1130 (h), 1120	860
Middle leg	380 (h), 350	130 (h), 120	1050 (h), 1130	1050 (h), 1120	640 (h), 630
Hind leg	290 (h), 280	110 (h), 120	900 (h), 1050	1120 (h), 1220	880 (h), 870
	Tarsomere 2	Tarsomere 3	Tarsomere 4	Tarsomere 5	Leg ratio
Fore leg	420 (h), 450	320	210 (h), 220	130 (h), 120	0.76 (h), 0.77
Middle leg	290	200 (h), 210	150	100	0.61 (h), 0.56
Hind leg	430 (h), 480	340 (h), 390	210 (h), 240	130	0.79 (h), 0.71

Note: (h), measurement from holotype; leg ratio, ratio of length of tarsomere 1 to length of tibia.

minute, 3–4 μm high. Acrostichals 107–112 in number, dorsocentrals 43–44, humerals 35–36, prealars 22–26, supraalars 2, anepisternals 2, preepisternals 3. Scutellum with 18–23 long, posterior setae and 16–20 short, anterior setae. Postnotum with 2–4 dorsal setae. Wing with dense setae on membrane. Length of Cu/length of M 0.90–0.93. Squama fringed with 30–32 setae. Legs with claws pointed apically. Lengths and ratios of leg segments in Table 3.

Genitalia (Fig. 5): Sternite VIII with 86–92 setae. Gonapophysis VIII with caudomesal angle of 60° or more. Rudiment of gonocoxite IX not visible as caudolateral projection in dorsal view. Gonapophysis IX well developed; notum 138–143 μm long. Labium fringed with fine setae. Seminal capsule pale, oval, 58 μm long and 45 μm wide. Segment X with 3 setae on each side.

Pupa. Body length 4.4–4.8 mm.

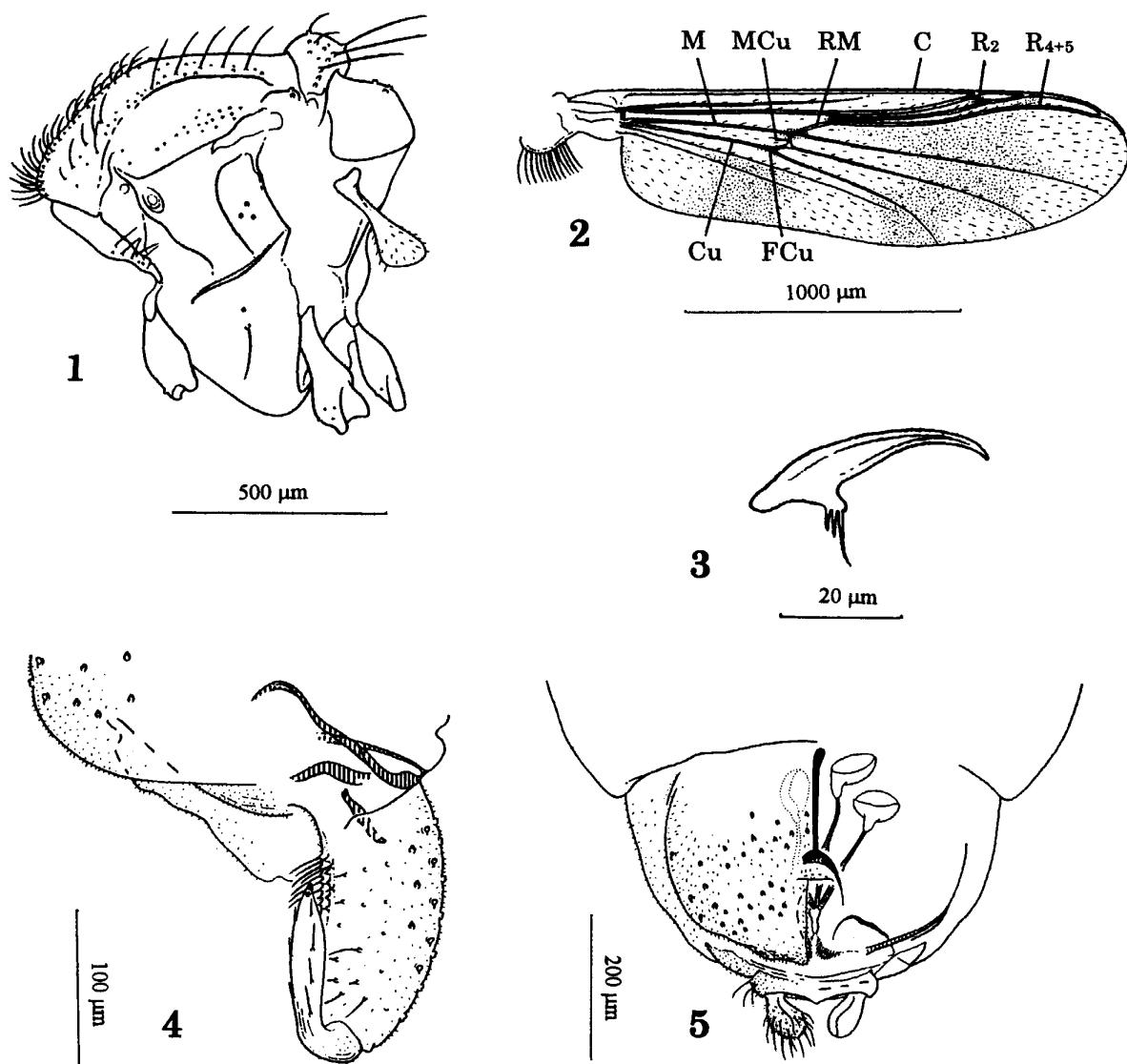
Coloration: Exuvium pale brown, with dark scar and apophyses on abdomen.

Cephalothorax: Thoracic horn (Fig. 6) 275–295 μm long, 1.84–2.20 times as long as broad. Plastron plate oval or somewhat rectangular, occupying apical 1/3 of tho-

Table 3. Lengths (μm) and ratios of leg segments in two females of *Brundiniella yagukiensis* sp. nov.

	Coxa	Trochanter	Femur	Tibia	Tarsomere 1
Fore leg	250, 260	170, 190	1000, 1040	1160, 1150	840
Middle leg	360, 350	130	1080, 1110	1100, 1130	630, 660
Hind leg	280, 300	120	930, 970	1240	870, 840
	Tarsomere 2	Tarsomere 3	Tarsomere 4	Tarsomere 5	Leg ratio
Fore leg	440, 430	330, 310	210	130, 120	0.72, 0.73
Middle leg	300, 320	220, 230	150, 160	100	0.57, 0.58
Hind leg	440, 460	340, 350	210, 220	120	0.70, 0.68

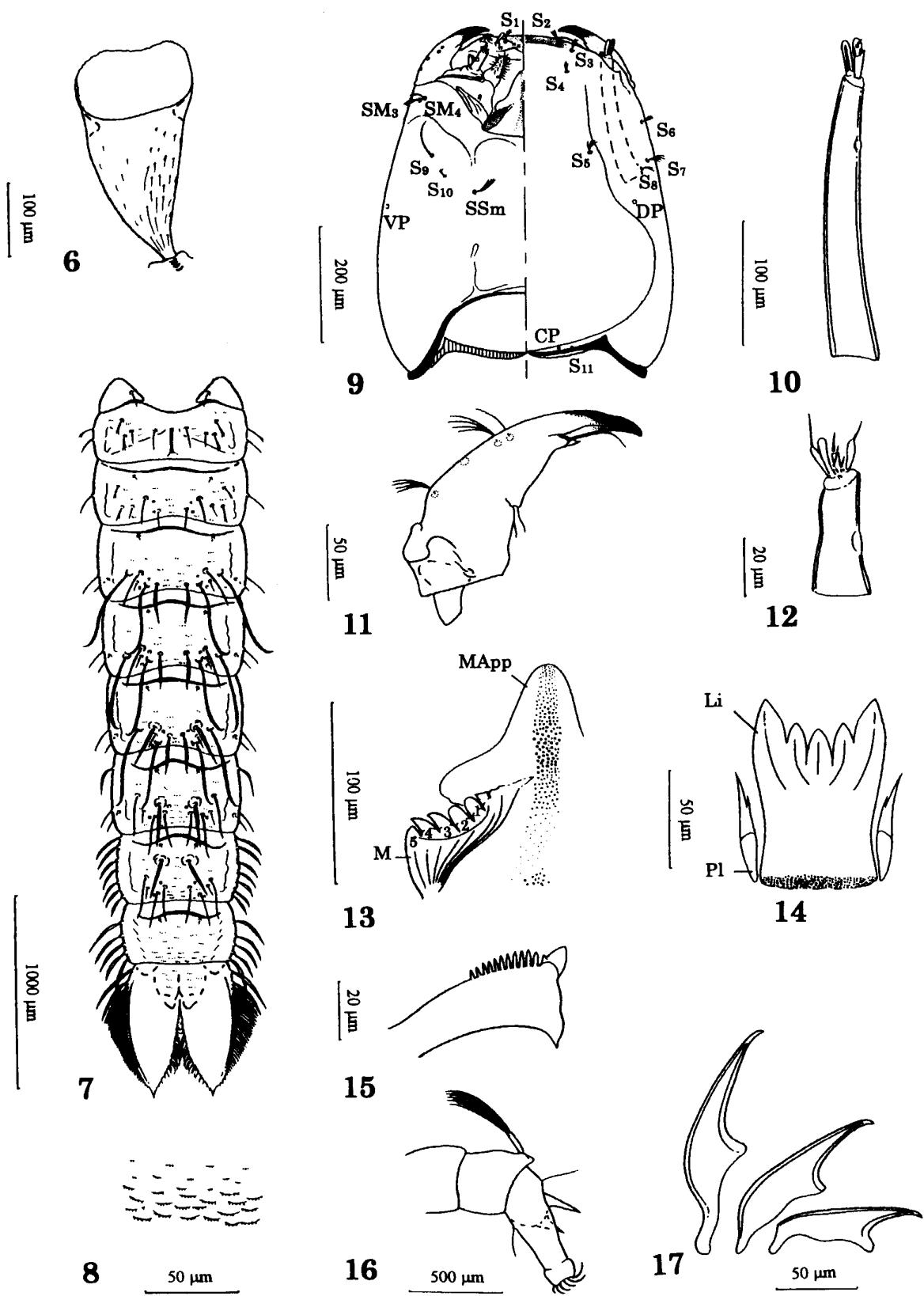
Note: leg ratio, ratio of length of tarsomere 1 to length of tibia.



Figs 1-5. Adults of *Brundiniella yagukiensis* sp. nov. Male (holotype): 1, thorax (lateral view); 2, wing; 3, claw; 4, hypopygium (dorsal view). Female (paratype): 5, genitalia (ventral view). Abbreviations: C, costa; Cu, cubitus; FCu, fork of cubitus; M, media; MCu, crossvein between media and cubitus; R₂ and R₄₊₅, branches of radius; RM, crossvein between radius and media.

racic horn.

Abdomen (Fig. 7): Scar on tergite I elongate, 125–140 μm , 9.17–12.75 times as long as wide. Shagreen (Fig. 8) mainly consisting of slightly arched serial rows of 4–5 spinules. D₁-setae stout and spiniform on tergites V–VII, positioned 0.75–0.83 of way from apophyse on tergite V, 0.67–0.71 on VI, 0.40–0.50 on VII. D₂-, D₃-, and D₅-setae taeniate on tergites III–V, these D₂- and D₃-setae long and hooked apically. Segment VI with 1 taeniate L-seta, VII with 7 taeniate L-setae, and VIII with 5 taeniate L-setae on each side; taeniate L-setae short, taeniate L-seta length/segment length 0.40–0.48 on segment VI, 0.23–0.38 on VII, 0.55–0.66 on VIII. Posterolateral corner of segment VIII markedly projecting ventrally. Anal lobe 2.37–2.62 times as long as broad. Male genital sac 0.38–0.41 times as long as anal lobe.



Fourth instar larva. Body length 5.1–6.5 mm. Head capsule length 590–640 μm .

Coloration: Head and claws of posterior parapod yellow, body yellowish white in life.

Head (Fig. 9): Cephalic index 0.77–0.82. Dorsal cephalic seta S_5 placed slightly anteromedial to S_7 ; S_7 , S_8 and dorsal sensory pore arranged nearly in a straight line; ventral cephalic seta S_{10} placed posteromedial to S_9 . Lengths of antennal segments I–IV 223–245, 20–25, 2–3, and 3–5 μm , respectively; antennal ratio 6.43–7.19. Antennal segment I 5.71–6.30 times as long as basal width, and with ring organ on about distal 1/5–1/4; blade 28–33 μm long, reaching to segment IV, and accessory blade 22–28 μm long (Fig. 10). Antennal segment II about 3 times as long as broad; style moderately long, 0.52–0.65 times as long as segment II, and reaching to apex of segment IV; intersegment II/III as long as Lauterborn organ. Mandible relatively slender, 155–175 μm long; basal tooth with 2 points (Fig. 11). Basal segment of maxillary palp 2.15–2.39 times as long as basal width, 40–45 μm long; ring organ positioned 0.41–0.47 of way from base (Fig. 12). Dorsomentum with 5 teeth and 1 inner lobe on each side; pointed projection of inner lobe weakly sclerotized (Fig. 13). Ligula 1.51–1.67 times as long as maximum width, 78–88 μm long; teeth arranged concavely (Fig. 14). Paraligula bifid, 45–50 μm long; fork positioned 0.61–0.72 of way from base. Pecten hypopharyngis with 1 large mesal tooth and 10–13 small teeth (Fig. 15).

Body: Four anal tubules tapering to pointed apex (Fig. 16). Procerus about 4 times as long as wide, with 10 anal setae. Posterior parapod with 16 claws; smaller claws depressed and expanded basally (Fig. 17).

Distribution. Japan (Fukushima Prefecture).

Etymology. From the type locality, Yaguki.

Remarks. This new species differs from the closely related *Brundiniella eumorpha* in having a vestigial scutal tubercle and setiferous preepisterna in the adult thorax, and a relatively slender segment I (length about 6 times basal width) in the larval antenna. In contrast, *B. eumorpha* has no scutal tubercle and no preepisternal seta in the adult, and a somewhat robust antennal segment I (4.5 times as long as basal width) in the larva, according to Roback (1971) and Fittkau and Roback (1983). All four examined pupal specimens of this new species have abdominal shagreen consisting of arched serial rows of 4–5 spinules, and have 7 taeniate L-setae on each side of abdominal segment VII. In the pupa of *B. eumorpha*, the shagreen consists of rows of 2–3 spinules and segment VII has 7–10, usually 8, taeniate L-setae on each side, according to Roback (1978a) and Fittkau and Murray (1986).

Biological notes. This new species was collected from a fontal stream in a forest. The larvae were found from sandy substrates in the stream with many larvae

Figs 6–17. Immature forms of *Brundiniella yagukiensis* sp. nov. Pupal exuvium (holotype): 6, thoracic horn; 7, abdomen (dorsal view); 8, shagreen spinules on abdominal tergite IV. Larval exuvium (holotype): 9, head with chaetotaxy (dorsal view on the right, ventral view on the left); 10, antenna; 11, mandible; 12, maxillary palp; 13, mentum and M appendage (1–5, tooth number); 14, ligula and paraligula; 15, pecten hypopharyngis; 16, posterior body segments (lateral view); 17, claws of posterior parapod. Abbreviations: CP, coronal sensory pore; DP, dorsal sensory pore; Li, ligula; M, mentum; MApp, M appendage; Pl, paraligula; S_{1-11} , cephalic seta 1–11; $SM_{3,4}$, seta maxillaris 3, 4; SSm, seta submenti; VP, ventral sensory pore.

of *Larsia miyagaseensis* Niitsuma, 2001 and *Nilotanyphus dubius* (Meigen, 1804).

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